

indication of allowance of the present application.

Claim Rejections-35 U.S.C. 102

Claims 1, 2, 3, 5, 6, 9, 11, 12, 14-25 and 31 have been rejected under 35 U.S.C. 102(e) as being anticipated by the Yonemitsu et al. reference (U.S. Patent No. 5,788,447). This rejection is respectfully traversed for the following reasons.

The multi-chamber system of an etching facility of claim 1 includes in combination a transfer path "adjacent to the cassette stage for providing space for transportation of wafers, the transfer path being at atmospheric pressure", and a plurality of processing chambers aligned with the transfer path. Applicants respectfully submit that the Yonemitsu et al. reference as relied upon by the Examiner does not disclose these features.

The Examiner has relied upon the embodiment described with respect to Figs. 2 and 3 of the Yonemitsu et al. reference. However, only atmospheric pressure section 200 of front section 100 of the Yonemitsu et al. reference is maintained at atmospheric pressure. Transfer chamber 50 of transfer section 500 is maintained under vacuum pressure, as may be generally understood in view of column 13, lines 18-22 and lines 55-56 of the Yonemitsu et al. reference. The Yonemitsu et al. reference as relied upon by the Examiner therefore does not disclose a transfer path at atmospheric pressure that is adjacent to a cassette stage and that is aligned with a plurality of processing chambers. Accordingly, Applicants respectfully submit that the multi-chamber system

of an etching facility of claim 1 distinguishes over the Yonemitsu et al. reference as relied upon by the Examiner, and that this rejection of claims 1, 2, 3, 5, 6, 9, 11, 12 and 14-19 is improper for at least these reasons.

The multi-chamber system of an etching facility of claim 20 includes in combination a transfer path "adjacent to the cassette stage for providing space for transportation of wafers, transfer path being at atmospheric pressure and having a width slightly larger than a diameter of the wafers", and a plurality of processing chambers aligned in a plurality of layers parallel to and beside the transfer path. The multi-chamber system of an etching facility of claim 31 includes in combination a transfer path at atmospheric pressure that is adjacent to a first cassette stage and a plurality of processing chambers similarly as noted above, and further includes a second cassette stage placed opposite to the first cassette stage. As noted above, only atmospheric pressure section 200 of front section 100 of the Yonemitsu et al. reference is maintained at atmospheric pressure. The Yonemitsu et al. reference therefore fails to disclose a multi-chamber system including the combination of a transfer path and a plurality of processing chambers as respectively featured in either of claims 20 and 31. Applicants therefore respectfully submit that the multi-chamber systems of claims 20 and 31 respectively distinguish over the Yonemitsu et al. reference as relied upon by the Examiner, and that this rejection of claims 20-25 and 31 is improper for at least these reasons.

Claims 1, 2 and 4 have been rejected under 35 U.S.C. 102(e) as being

anticipated by the Yokoyama et al. reference (U.S. Patent No. 5,820,679). This rejection is respectfully traversed for the following reasons.

As described in column 13, lines 27-31 of the Yokoyama et al. reference, transporter 101 as illustrated in Fig. 1 transports the wafers in a high purity nitrogen atmosphere and includes a mechanism which moves semiconductor wafers along one direction by a belt. As may be further understood in view of the metal film deposition apparatus illustrated in Fig. 2 for example, the processing clusters each include transporting mechanisms such as 102-9 in corresponding chambers such as 102-1. Accordingly, the Yokoyama et al. system does not include a "transfer mechanism installed in the transfer path for loading and unloading the wafers stacked on the cassette stage", as featured in claim 1. Applicants therefore respectfully submit that the multi-chamber system of an etching facility of claim 1 distinguishes over the Yokoyama et al. reference as relied upon by the Examiner, and that this rejection of claims 1 and 2 is improper for at least these reasons.

Claims 1, 2 and 8 have been rejected under 35 U.S.C. 102(b) as being anticipated by the Ono et al. reference (U.S. Patent No. 5,527,390). This rejection, insofar as it may pertain to the presently pending claims, is traversed in view of the following.

The multi-chamber system of an etching facility of claim 1 includes in combination "at least one load lock chamber, coupled between the plurality of processing chambers and the transfer path, serving as a standby area for the wafers".

In Fig. 1 of the Ono et al. reference as relied upon by the Examiner, load lock chambers are not disposed between transfer path 24 and upright type heat treatment apparatuses 10, 12, 14 and 16. Moreover, chambers 10, 12, 14 and 16 are merely heat treatment chambers, not processing chambers. Accordingly, Applicants respectfully submit that the multi-chamber system of an etching facility of claim 1 distinguishes over the Ono et al. reference as relied upon by the Examiner, and that this rejection, insofar as it may pertain to claims 1, 2, and 8, is improper for at least these reason.

Claim Rejections-35 U.S.C. 103

Claims 26-30 have been rejected under 35 U.S.C. 103(a) as being obvious over the Yonemitsu et al. reference, in view of the Hiroki reference (U.S. Patent No. 5, 306,380). Claims 7 and 10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Yonemitsu et al. reference. Also, claims 13 and 32 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Yonemitsu et al. reference in view of the Hiroki reference, and in further view of the Maydan et al. reference (U.S. Patent No. 4,951,601). Applicants respectfully submit that the above noted references as relied upon by the Examiner do not overcome the previously noted deficiencies of the Yonemitsu et al. reference. Accordingly, Applicants respectfully submit that the above noted claims distinguish over and would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, at least by virtue of dependency upon the corresponding independent claims and by

further reasons of the features therein.

Conclusion

The Examiner is respectfully requested to reconsider and withdraw the corresponding rejections and to pass the claims of the present application to issue for at least the above reasons.

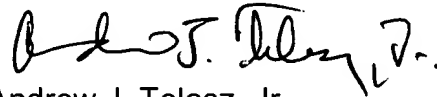
In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Andrew J. Telesz, Jr. (Reg. No. 33,581) at (703) 715-0870 in the Washington, D.C. area, to discuss these matters.

Pursuant to the provisions of 37 C.F.R. 1.17 and 1.136(a), the Applicants hereby petition for an extension of one (1) month to May 3, 2001 for the period in which to file a response to the outstanding Office Action. The required fee is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Enclosures: Version with marked-up changes

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of

Ki-sang KIM et al.

Group Art Unit: 1763

Serial No.: 09/237,229

Examiner: Lund, J.

Filed: January 26, 1999

MULTI-CHAMBER SYSTEM HAVING COMPACT INSTALLATION SET-UP FOR AN
ETCHING FACILITY FOR SEMICONDUCTOR DEVICE MANUFACTURING

PRELIMINARY AMENDMENT

Honorable Assistant Commission of Patents and Trademarks,
Washington, D.C. 20231

Date: June 30, 2000

Sir:

Preliminary to the examination of the above-identified application, please enter
the following amendments and remarks.

In the Specification:

Kindly amend the specification as follows:

Page 20, line 7, change "means" to --car--.

In the Claims:

Please amend the claims as follows:

Twice

1. (Amended) A multi-chamber system of an etching facility for manufacturing

semiconductor devices comprising:

a cassette stage for mounting a cassette having wafers stacked thereon;
a transfer path adjacent to the cassette stage for providing space for transportation of wafers, the transfer path being at atmospheric pressure [having a width slightly larger than a diameter of the wafers];

a plurality of processing chambers aligned with the transfer path; [and]
a transfer mechanism installed in the transfer path for loading and unloading the wafers stacked on the cassette stage [to the plurality of processing chambers].

; and
at least one load lock chamber, coupled between the plurality of processing chambers and the transfer path, serving as a standby area for the wafers

3. (Amended) The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim 1, wherein each processing chamber has a gate formed on a side [facing] away from the transfer path, the gate being selectively opened and closed to allow passage of the wafers.

^{Twice}
20. (Amended) A multi-chamber system of an etching facility for manufacturing semiconductor devices comprising:

a cassette stage for mounting a cassette having wafers stacked thereon;
a transfer path adjacent to the cassette stage for providing space for transportation of wafers, the transfer path being at atmospheric pressure and having a width slightly larger than a diameter of the wafers;
a plurality of processing chambers aligned in a plurality of layers [multi-layers] parallel to and beside the transfer path; and

a transfer mechanism capable of vertical/horizontal reciprocal movement installed in the transfer path for loading and unloading the wafers stacked on the cassette stage to the plurality of processing chambers.

22. (Amended) The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim 20, wherein the plurality of layers [multi-layers] of the processing chambers include [number] 2 to 5 layers.

24. (Amended) The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim 23, wherein the load lock chamber comprises:

a transfer arm for receiving wafers from the transfer mechanism and transferring the wafers to the processing [chamber] chambers;

an inner transfer device for moving the transfer arm; and

gates formed on a side of the transfer path and [a side] sides of the processing chambers [chamber], respectively, the gates being selectively opened and closed to allow passage of the wafers.

26. (Amended) The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim 20, wherein the transfer mechanism comprises:

a transfer arm having a vacuum line so as to selectively vacuum-absorb the wafers;

a transfer robot for loading and unloading the wafers into the processing chambers [chamber] by moving the transfer arm;

a vertical driving part for moving the transfer robot vertically;

a horizontal driving part for moving the transfer robot horizontally; and

a controller for controlling the transfer robot, the vertical driving part, and the horizontal driving part by applying control signals thereto.

Twice
31. (Amended) A multi-chamber system of an etching facility for manufacturing semiconductor devices comprising:

a first cassette stage for mounting a cassette having unprocessed wafers stacked thereon;

a transfer path adjacent to the first cassette stage that provides space for transportation of wafers, the transfer path being at atmospheric pressure and having a width slightly larger than a diameter of the wafers [having a rectangular shape and providing a space for transportation of wafers];

a plurality of processing chambers arranged in multi-layers and aligned in parallel beside the transfer path;

a transfer mechanism capable of vertical/horizontal reciprocal movement installed in the transfer path for loading and unloading the wafers stacked on the first cassette stage [to the plurality of processing chambers]; and

a second cassette stage placed opposite to the first cassette stage and mounting thereon a cassette having processed wafers stacked thereon.

Remarks

Claims 1-32 are pending in the present application.

The claims have been amended to emphasize that the transfer path is maintained at atmospheric pressure and to improve form. Favorable consideration and allowance of the present application as considered along with the Preliminary Amendment is earnestly solicited.

Applicants respectfully request the Examiner to acknowledge receipt of the Information Disclosure Statement filed on June 16, 2000 in connection with this application and to cite the corresponding document of record in the present application.

In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Andrew J. Telesz, Jr. (Reg. No. 33,581) at (703) 715-0870 in the Washington, D.C. area, to discuss these matters.

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4. The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim 1, wherein a load lock chamber is connected to one side of the processing chamber, the load lock chamber serving as a stand-by area for the wafers.

(Amended)

5. The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim ¹4, wherein ^{each of at least one chambers} the load lock ^{chambers} [chamber] comprises:
a transfer arm for receiving the wafers from the transfer mechanism and transferring the wafers to ^{a corresponding} [the] processing chamber;
an inner transfer device for moving the transfer arm; and
gates formed on a side of the transfer path and a side of ^{corresponding} the processing chamber, respectively, the gates being selectively opened and closed to allow passage of the wafers.

6. The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim 5, wherein the transfer arm comprises a plurality of transfer arms for simultaneously transferring a plurality of wafers.

(Amended)

7. The multi-chamber system of an etching facility for manufacturing semiconductor devices according to claim ¹4, wherein ^{each of at least one chambers} the load lock ^{chambers} [chamber] has a vacuum pressure generator for forming vacuum pressure therein.

(Amended)

1 8. The multi-chamber system of an etching facility for manufacturing
2 semiconductor devices according to claim ¹4, wherein the plurality of processing chambers
3 have one common load lock chamber.

1 9. The multi-chamber system of an etching facility for manufacturing
2 semiconductor devices according to claim 1, wherein processing chambers are connected
3 by gates such that wafers finishing one process in one processing chamber can be directly
4 moved to another processing chamber for a subsequent process.

1 10. The multi-chamber system of an etching facility for manufacturing
2 semiconductor devices according to claim 1, wherein the processing chambers have a
3 vacuum pressure generator for forming vacuum pressure therein.

1 11. The multi-chamber system of an etching facility for manufacturing
2 semiconductor devices according to claim 1, wherein the transfer mechanism comprises:
3 a transfer arm for selectively holding the wafers;
4 a transfer robot for loading and unloading the wafers into the processing chamber
5 by moving the transfer arm;
6 a horizontal driving part for moving the transfer robot horizontally; and

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